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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/754,570	01/04/2001	Evgeny Yakhnich	2681/01134	2874

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ZARETSKY & ASSOCIATES PC
8753 W. RUNION DR.
PEORIA, AZ 85382-6412

EXAMINER

ODOM, CURTIS B

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/754,570

Applicant(s)

YAKHNICH ET AL.

Examiner

Curtis B. Odom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-74 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-17, 32, 33, 35-43 and 46-48 is/are allowed.
- 6) ☒ Claim(s) 18-31, 34, 44, 45, 49-51, 54-65 and 67-71 is/are rejected.
- 7) ☒ Claim(s) 52, 53, 66 and 72-74 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 4/17/01 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Objections

2. Claims 18-31, 36, 47 objected to because of the following informalities:
 - a. Regarding claims 18-31, in claim 18, line 15, the phrase "said plurality" is suggested to be changed to "a plurality".
 - b. Regarding claim 36, the phrase "second decoder" is suggested to be changed to "outer decoder".
 - c. Regarding claim 47, the phrase "soft second decoder" is suggested to be changed to "soft decoder".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 18-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 18 recites the limitation "wherein each said second soft symbol value corresponds to a symbol closest in Euclidean distance to said most likely symbol whose bit in the position is opposite that of the analogous bit in said most likely symbol. However, after reviewing the specification (pg. 21, lines 17-24), there is no description in which there is a Euclidean distance calculated to determine the symbol closest to the most likely symbol.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 20 and 34 recite the limitation "'said communications receiver". There is insufficient antecedent basis for this limitation in the claim.
7. Claims 44, 45, and 65 recite the limitation "the $m+1$ soft symbol values" in claims 44 and 65. There is insufficient antecedent basis for this limitation in the claim.
8. Claims 55-57 recite the limitation "said decoded output data signal. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 49-51, 54, 60-64, and 67-71 are rejected under 35 U.S.C. 102(e) as being anticipated by Dent et al. (U. S. Patent No. 6, 625, 236).

Regarding claim 49, Dent et al. discloses a method (column 3, lines 57-63) of generating soft bit outputs from soft symbol decisions, the method comprising the steps of:

receiving (Fig. 2, blocks 22-36, column 3, lines 57-column 4, line 11, and column 11, lines 26-59) a plurality of soft symbol values for each symbol;

determining (column 7, lines 46-53), for each bit in the symbol, a first likelihood representing the probability that the bit is a one;

determining (column 7, lines 46-53), for each bit in the symbol, a second likelihood representing the probability that the bit is a zero;

computing (column 7, lines 46-53, ratio) a soft bit value for the bit as a function of the first likelihood and the second likelihood.

Regarding claims 50, which inherits the limitations of claim 49, Dent et al. discloses the first likelihood is determined by summing the soft symbol values for all symbols wherein the bit is a one (column 7, lines 46-53).

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Regarding claim 51, which inherits the limitations of claim 49, Dent et al. discloses the second likelihood is determined by summing the soft symbol values for all symbols wherein the bit is a zero (column 7, lines 46-53).

Regarding claim 54, Dent et al. discloses a communications receiver (Figs. 1 and 2) for receiving and decoding an M-ary transmitted signal (column 6, lines 12-28, 8-PSK signal), comprising:

- an RF front end circuit (Fig. 1, block 12, column 10, lines 14-44) for receiving and converting the M-ary transmitted signal to a baseband signal;

- a demodulator (Fig. 2, block 28, column 11, lines 42-43) adapted to receive the baseband signal and to generate a received signal therefrom in accordance with the M-ary modulation scheme used to generate the transmitted signal;

- a first decoder (Fig. 2, block 28 and 36, , column 3, lines 57-column 4, line 11 and column 11, lines 26-59) operative to receive the received signal and to generate a sequence of soft symbol decisions therefrom;

- a soft symbol decision to soft bit output converter (Fig. 2, block 42, column 11, lines 59-60) comprising processing means programmed to:

 - determine (column 7, lines 46-53), for each bit in the symbol, a first likelihood representing the probability that the bit is a one;

 - determine (column 7, lines 46-53), for each bit in the symbol, a second likelihood representing the probability that the bit is a zero;

 - compute (column 7, lines 46-53, ratio) a soft bit value for the bit as a function of the first likelihood and the second likelihood; and

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a second decoder (Fig. 2, block 46, column 11, lines 61-64) adapted to receive the soft bit values and to generate binary received data therefrom.

Regarding claim 60, which inherits the limitations of claim 54, Dent et al. discloses the second decoder comprises a convolutional decoder based on the Viterbi Algorithm (column 13, lines 47-65).

Regarding claim 61, which inherits the limitations of claim 54, Dent et al. discloses the M-ary symbol comprises an 8-PSK symbol (column 7, lines 22-40).

Regarding claim 62, which inherits the limitations of claim 54, Dent et al. discloses the step of generating the soft decision value represented as a LLR (column 11, lines 44-47).

Regarding claim 63, which inherits the limitations of claim 54, Dent et al. discloses the first decoder comprises a MLSE equalizer based on the SOVA (column 2, lines 1-23).

Regarding claim 64, which inherits the limitation of claim 54, Dent et al. discloses the first decoder comprises means for performing a MAP algorithm (column 2, lines 50-63).

Regarding claim 67, which inherits the limitations of claim 54, Dent et al. discloses the step of outputting the soft bit values to a de-interleaver whose output is subsequently input to a soft second decoder for decoding into binary data therefrom (Fig. 2, block 48, column 11, lines 61-64).

Regarding claim 68, which inherits the limitations of claim 54, Dent et al. discloses an electronic data storage medial storing a computer program adapted to program a computer to execute the soft output generator process (column 13, lines 13-17).

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Regarding claims 69-71, Dent et al. discloses all the limitations of claims 69-71 (see rejection of claims 49-51) including the method written as a computer program (software) in a computer readable storage medium (column 13, lines 13-17).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 55-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dent et al. (U. S. Patent No. 6, 625, 236).

Regarding claims 55-57, which inherit the limitations of claim 54, Dent et al. does not disclose a speech decoder, switch data means, or packet switch data means to convert the output of the second decoder to a speech signal or data stream. However, it would have been obvious to one of ordinary skill in the art that the output of the second decoder which provides a decoded output signal could have been processed in many different ways. It is well known in the art that speech decoders produce speech signals and switches can be used to convert a signal to a data stream. Thus, the further processing the signal from the output of the decoder does not constitute patentability.

Regarding claims 58 and 59, Dent et al. does not disclose the communications receiver is adapted to receive and decode a GSM signal or a GERAN system signal. However, it would

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have been obvious to one of ordinary skill in the art at the time the invention was made that if these signal were modulated and transmitted using symbols from an alphabet of symbols (column 5, lines 43-53) that the communications receiver would have been adapted to receive and decode these signals. Thus, claims 58 and 59 do not constitute patentability.

Allowable Subject Matter

13. Claims 1-17, 32, 33, 35-43 and 46-48 are allowable over prior art references (if above objections are overcome) because related references do not disclose partitioning soft symbol decisions into bit groups, each group comprising a zero bit portion and a one-bit portion and determining soft bit values from those groups.

14. Claims 52, 53, 66, and 72-74 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Baum et al. (U. S. Patent No. 5, 446, 763) discloses an apparatus and method for converting soft symbols into soft bits.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom
May 24, 2004



STEPHEN CHIN
SUPERVISORY PATENT EXAMINEE
TECHNOLOGY CENTER 2600